

REMARKS

Applicant notes that the Examiner has made the restriction requirement FINAL.

Claims 1 and 13 were rejected under 35 U.S.C. 112, first paragraph, for the several reasons stated by the Examiner. Claims 1 and 13 have been amended for the purpose of simplifying and reorganizing the text in response to the Examiner's rejection.

More specifically the present specification fully supports the current claim recitation that each region extends substantially completely through the matrix of the article or member. The entire invention and its description is based on distinguishing and defining the differences structurally required according to the present invention in separate and distinct regions that extend, as in pieces of a jig-saw puzzle, completely between opposing surface-to-surface regions.

One specific example described on page 1 of the description is an edge region of an article or member typically an exhaust flap, from separate and distinct other regions completely through the flap and away from the edge region. Figure 1 shows a region 12, typically a hot spot well known in the gas turbine engine art to extend completely through panel 10 and distinct from region 14. More particularly and exactly in point is the embodiment represented by Figure 4 and its description on page 8 of the specification. That embodiment clearly shows and describes an embodiment of the present invention as a structure comprising an aligned stack of a plurality of fabric layers extending completely through a reinforcing fiber preform. Each fabric includes distinct, separate regions which, when stacked, each extend completely through an article or member preform prior to introduction of a matrix. To emphasize that embodiment, new claims 35-37 have been added, fully supported by the specification. Such a structure is provided as a preform prior to matrix impregnation, by stacking a plurality of woven reinforcing fabric layers or shapes, in a manner well known and widely used for decades in the art to which the present invention relates: the making of a fiber reinforced composite article or member. The present invention defines an arrangement of reinforcing fibers as a function of the stress experienced by the article or member under its thermal operating conditions.

Applicant's reference to operating temperatures and stresses in a product claim is included, and believed to be required, in order to enable an accurate determination and definition of the mechanical properties required for the reinforcing fibers according to the present invention. In addition, it provides a necessary antecedent basis for dependent claims.

In respect to the term "discrete" used in claims 1 and 13 to define regions of the article or member, that term is included in the specification, for example on page 4, line 23, to indicate a region detached, distinct or separate from other regions. The term "discrete" is commonly and frequently used in that context and is defined in common dictionaries. It is not seen how use of such a common, widely used and well-defined word can render a claim indefinite.

Claims 1, 2, 4, 6, 8-10, 13-14, 16, and 18 were rejected under 35 U.S.C. 102(b) as being anticipated by Parthasarathy et al., U.S. Patent 6,251,815 B1 for the reasons stated by the Examiner previously and in this action.

As applicant discussed in the communication filed 14 February 2002, repeated here, a "region" defined by the reference has a completely different meaning than that defined by applicant. Applicant has proven above that the meaning of "region" according to the present invention is one extending completely through, between opposing external surfaces, as a distinct, separate structural feature of an article or member. Such a region has been defined, particularly in the embodiment represented by present Figure 4, in such a manner, similar to contiguous, adjoined members of a jig-saw puzzle.

It is recognized that the article of the reference comprises different reinforcing fibers disposed in a matrix, together defining a similarly used reinforced composite article that can include fibers and matrix, similar to that of the present invention. That fact is not pertinent to anticipating the concept of the present invention. What should be recognized is that the entire reference defines regions of their article as being of a different kind from that of the present invention: that their regions are portions extending

inwardly from an article surface for a distance but not completely through the article, from a cool region toward an opposing hot region. As described by the reference, between such opposing surfaces, a plurality of regions are disposed, for example separate regions at each surface along with at least one region therebetween. No region of the article of the reference extends completely between and through the cool and hot regions to the article surface as in the present invention. Therefore, the structure of the article of the reference is of a completely different kind than that of the present invention and is provided to accomplish a different purpose than that of the present invention. The reference provides a plurality of regions from cool to hot; the present invention provides a single region between opposing surfaces, each substantially in the same temperature range.

The above-identified rejected claims dependent on generic claims 1 and 13 represent forms of the present invention and derive patentable novelty at least from such generic claims. For all of the reasons presented above and in the previous response, it is respectfully requested that the Examiner reconsider and withdraw this rejection under 35 U.S.C. 102(b).

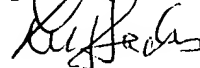
Claims 1, 3, 5, 7, 11-12, 15, and 17 were rejected by the Examiner under 35 U.S.C. 103(a) as being unpatentable over Parthasarathy et al., U.S. Patent 6,251,815 B1 for the reasons presented by the Examiner.

All of the above discussion and reasons that the present invention is patentable over the reference is repeated here. In addition, neither provision in the article or member of the structural stress interrelationships between regions according to the present invention as defined in claims 3 and 15, nor the volume range for fibers in a region to provide desired structural stress as defined in claims 7, 11, and 12, are remotely recognized, discussed or implied by the reference. For one reason, the article regions of the reference are of a different kind and for a different purpose. For all of these reasons and arguments, it is respectfully requested that the Examiner reconsider and withdraw this rejection under 35 U.S.C 103(a).

Claims 35 and 36, dependent on claim 1, and claims 37 and 38, dependent on claim 13 have been added as embodiments of the present invention. Such embodiments are described in Figure 4 and the related description on page 8 of the present specification. In general, it is well known in the art of making fiber reinforced composite articles that stacks of layers, mats, or fabric are used for fiber reinforcement. The above-identified reference mentions (col. 3, lines 11 – 24) such general method among a variety of methods well known and used in the art. For all of the reasons presented above, the presently applied art and art of record in this application do not, alone or in any combination discuss, suggest or imply the embodiments of the newly added dependent claims. However, it is believed that such art is sufficient to evaluate the anticipation or patentability of the newly added claims.

For all of the reasons presented above, it is respectfully requested that the Examiner enter this amendment, and reconsider and withdraw all objections and rejections of the claims presently under consideration in this application.

Respectfully submitted,



Lee H. Sachs
Reg. No. 18898

General Electric Co.
P.O. Box 156301 – M/D H-17
Cincinnati, Ohio 45215 – 6301
(513) 243 - 9835
June 18, 2002

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend claims 1 and 13 as follows:

1. (twice amended) A fiber reinforced composite article comprising a matrix and reinforcing fibers[, the article during operation use subjected concurrently in the article to a plurality of operating temperatures and stresses, varying between a plurality of discrete regions across, within and through the article between opposing surfaces, each region identified by a surface area A, the regions together defining a total area T of the surface of the article;] wherein:

the article comprises a plurality of discrete regions each extending substantially completely through the matrix of the article;

a first region of the article during operation use subjected to a first temperature and a first stress, and including first fibers having a first strength greater than the first stress; and,

a second region of the article during operation use subjected to a second temperature less than the first temperature and a second stress greater than the first stress, and including second fibers having a second strength greater than the second stress.

13. (thrice amended) A member comprising reinforcing fibers for reinforcement of a fiber reinforced composite article, the member comprising a matrix and the reinforcing fibers wherein: [during operation use subjected concurrently in the member to a plurality of operating temperatures and stresses, varying between a plurality of discrete regions across, within and through the member between opposing surfaces, each region identified by a surface area A, the regions together defining a total area T of the surface of the article;]

the member comprises a plurality of discrete regions each extending substantially completely through the matrix of the member;

a first region of the member during operation use subjected to a first temperature and a first stress, and including first fibers having a first strength greater than the first stress; and,

a second region of the member during operation use subjected to a second temperature less than the first temperature and a second stress greater than the first stress, and including second fibers having a second strength greater than the second stress.

Please add the following new claims:

35. The article of claim 1 in which:

the first region comprises a first stack of first fiber woven fabric shapes, the first stack extending substantially completely through the first region, the first woven fabric comprising a first combination of reinforcing fibers; and,

the second region comprises a second stack of second fiber woven fabric shapes, the second stack extending substantially completely through the second region, the second woven fabric comprising a second combination of reinforcing fibers different from the first combination.

36. The article of claim 35 in which the first combination of reinforcing fibers of the first woven fabric shape for the first stack and the second combination of reinforcing fibers of the second woven fabric shape for the second stack each are included in a pattern repeated in a fabric, a plurality of the fabric providing the first and second stacks.

37. The member of claim 13 in which:

the first region comprises a first stack of first fiber woven fabric shapes, the first stack extending substantially completely through the first region, the first woven fabric comprising a first combination of reinforcing fibers; and,

the second region comprises a second stack of second fiber woven fabric shapes, the second stack extending substantially completely through the second region, the second woven fabric comprising a second combination of reinforcing fibers different from the first combination.

38. The member of claim 37 in which the first combination of reinforcing fibers of the first woven fabric shape for the first stack and the second combination of reinforcing fibers of the second woven fabric shape for the second stack each are included in a pattern in a fabric, a plurality of the fabric providing the first and second stacks.